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10/056,054	01/28/2002	Shunpei Yamazaki	0756-2427	3991

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EXAMINER

PHAM, THANHHA S

ART UNIT PAPER NUMBER

2813

DATE MAILED: 07/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/056,054

Applicant(s)

YAMAZAKI ET AL.

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 13-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-12 and 20-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6, 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This Office Action responds to Applicant's Amendment and Election in Paper No. 11 dated 4/16/03.

Election/Restrictions

1. Claims 1-6 and 13-19 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 11.
2. Applicant's election without traverse of claims 7-12 and 20-27 in Paper No. 11 is acknowledged.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 7-12 and 20-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

- With respect to claim 7, it is not clear that "intense light" as cited on line 3 is the same or different to "intense light" as cited on line 8.
- With respect to claim 8, it is not clear that "the intense light" refers to which intense light in claim 7 – "intense light" as cited on line 3 of claim 7 OR "intense light" as

cited on line 8 of claim 7. In addition, it is not clear where "the substrate" comes from and is located.

➤ With respect to claims 9-10, it is not clear that "the intense light" refers to which intense light in claim 7 – "intense light" as cited on line 3 of claim 7 OR "intense light" as cited on line 8 of claim 7.

➤ With respect to claim 11, it is not clear that "the intense light" refers to which intense light in claim 7 – "intense light" as cited on line 3 of claim 7 OR "intense light" as cited on line 8 of claim 7. In addition, it is not clear what gas is considered as a reducing gas.

➤ With respect to claim 20, it is not clear that "intense light" as cited on line 5 is the same or different to "intense light" as cited on line 10.

➤ With respect to claim 21, it is not clear that "the intense light" refers to which intense light in claim 20 – "intense light" as cited on line 5 of claim 20 OR "intense light" as cited on line 10 of claim 20. In addition, it is not clear where "the substrate" comes from and is located.

➤ With respect to claim 22-23, it is not clear that "the intense light" refers to which intense light in claim 20 – "intense light" as cited on line 5 of claim 20 OR "intense light" as cited on line 10 of claim 20.

➤ With respect to claim 11, it is not clear that "the intense light" refers to which intense light in claim 20 – "intense light" as cited on line 5 of claim 20 OR "intense light" as cited on line 10 of claim 20. In addition, it is not clear what gas is considered as a reducing gas.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 27 is rejected under 35 U.S.C. 102(b) as being anticipated by Zhang et al [US 5,529,937].

Zhang et al, figs 1's and col 1-22, discloses the claimed method of manufacturing a semiconductor device comprising:

providing a semiconductor film (104, fig 1B, col 9 lines 10-31) with a metal for promoting crystallizing said semiconductor film;

crystallizing said semiconductor film (col 9 lines 24-26);

irradiating the crystallized semiconductor film with laser light to increase crystallinity of the crystallized semiconductor film (col 9 lines 45-59); and

irradiating intense light to the crystallized semiconductor film after the irradiation of the laser light (col 10 lines 1-5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7-12, as being best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Aya et al [JP 11-074536] in view of Ohtani et al [US 5,904,770].

Aya et al, figs 1-12 and text paragraph [0001]-[0108] discloses a method for manufacturing a semiconductor device comprising the steps of:

crystallizing a first semiconductor film (2, fig 1, text paragraph [0023]-[0024]) to form a second semiconductor film (3, fig 2);

irradiating laser light of an excimer laser to the second semiconductor film to form a third semiconductor film having a plurality of convexes (text paragraph [0026]-[0030], [0038]-[0039]); and

irradiating a second intense light of Xe arc lamp in atmosphere of nitrogen gas to the third semiconductor film to form a fourth semiconductor film (text paragraph [0031]-[0032], [0041]).

Aya et al does not expressly teach irradiating a first intense light to the first semiconductor film to form the second semiconductor film. Instead, Aya et al using thermal treatment for crystallizing the first semiconductor film (amorphous film) to form the second semiconductor film (crystalline film).

However, Ohtani et al teaches irradiating the intense light (infrared light with halogen lamp) to transform/crystallize the first semiconductor film (amorphous film) to the semiconductor film (crystalline film) wherein a damage to a substrate being

suppressed (see col 10 lines 53-67). Ohtani et al also teaches equivalence of using heat treatment and irradiating the intense light to crystallize semiconductor film.

Therefore, it would have been obvious for those skilled in the art to modify process of Aya et al by irradiating the first intense light to the first semiconductor film to form the second semiconductor film as taught by Ohtani et al to prevent damage to the substrate when performing crystallizing process.

6. Claims 20-27, as being best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Aya et al [JP 11-074536] in view of Ohtani et al [US 5,904,770].

Aya et al, figs 1-12 and text paragraph [0001]-[0108] discloses a method for manufacturing a semiconductor device comprising the steps of:

crystallizing a first semiconductor film (2, fig 1, text paragraph [0023]-[0024]) to form a second semiconductor film (3, fig 2);

irradiating laser light of an excimer laser to the second semiconductor film to form a third semiconductor film having a plurality of convexes (text paragraph [0026]-[0030], [0038]-[0039]); and

irradiating a second intense light of Xe arc lamp in atmosphere of nitrogen gas to the third semiconductor film to form a fourth semiconductor film (text paragraph [0031]-[0032], [0041]).

Aya et al does not teach forming the second semiconductor film using crystallizing providing a first semiconductor film with a metal of Ni for promoting

crystallization and irradiating a first intense light to the first semiconductor film to form the second semiconductor film.

However, Ohtani et al (col 10 lines 53-67 and col 3-5) teaches forming the second semiconductor film (21/12, fig 2A) by providing the first semiconductor film with a metal of Ni for promoting crystallization and irradiating a first intense light to the first semiconductor film to form the second semiconductor film.

Therefore, it would have been obvious for those skilled in the art to modify process of Aya et al by providing the first semiconductor film and irradiating the first intense light to the first semiconductor film as being claimed, per taught by Ohtani et al, to form a better second semiconductor film for reducing surface roughness caused by irradiation of the laser light in subsequent step thereby forming a better semiconductor device with less problem of carrier scattering.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (703) 308-6172. The examiner can normally be reached on Monday-Thursday 8:00 AM - 7:00 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-3432 for regular communications and (703) 308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Thanhha Pham
June 26, 2003


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800